SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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THE ISLAND OF EASDALE.—No. I.

BY JOHN WHITE, LATE MANAGER.

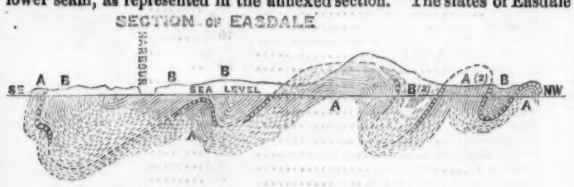
The little island of Easdale, so insignificant in geographical extent as to be omitted from most of the elementary maps of Scotland, is the property of the Marquis of Breadalbane, and lies near the western shore of Seil Island, from which it is separated by a sound only 150 yards in breadth. These islands are embraced in that insular chain which extends northward from the island of Jura to the head of Loch Linnhe, on the west coast of Argyleshire. The outline of Easdale is somewhat triangular. Its extreme dimensions are about 760 yards by 850; and although it can boast of an eminence of about 130 ft. high, a great portion of its surface is little elevated above high-water mark, being also bestrewn with quarry debris and slate chippings, while vegetation is extremely scanty. On the west and south-west its coast is exposed to the Atlantic Ocean, and during storms the violent beating of the surge upon the shore is most appalling, the water obtained from the wells being brackish for months afterwards, on account of the great quantity of sea drift scattered upon the land. To remedy this state of matters, the late noble proprietor conferred a great boon upon the inhabitants by supplying them with excellent water from the adjoining island, by means of pipes laid under the sound.

The general geology of the island may be described in a few words. It is comprehended in the extensive slate district of the north-west of Scotland, in reference to the stratigraphical relations of which there is some difference of opinion. It may, however, be safely asserted that the various schistose rocks of this district are among the most ancient of the sedimentary strata, whether we follow some geologists in classing them as the oldest under the Metamorphic system of Lyell, or adopt the opinion of Murchison, that they ought to be regarded as Silurian strata, and more recent than the so-called "Laurentian" and "Cambrian" rocks.

Although Easdale is composed mainly of clay-slate, it also contains blue limestone and several varieties of trap, but the position and composition of these we shall allude to more particularly in the sequel. It is well known to slate miners that roofing slates are usually distributed in bands through other rocks of a slaty character, of little or no economic value, and not unfrequently associated with quartzite, and limestones more or less impure.

The Island of Easdale would probably have attracted little attention had it not contained such slate bands. These appear in two seams, which may be traced in the accompanying section through their various contortions from one end of the island to the other. These seams are made up of different beds, varying in thickness from a few inches to many feet, like our sandstones and limestones, but frequently so closely united that only a practised eye can detect the line of contact, whilst the superinduced phenomenon of cleavage constitutes a distinct dissimilarity between them and the other rocks referred to. It may be noticed as an indication of the sedimentary character of these slate rocks, that there is a decided difference in the quality of the upper and lower portions of the thicker beds, the former being fine-grained and smooth, and the latter coarse and gritty, a feature which we recognise as analogous to that exhibited by other rocks of sedimentary origin.

Although the slate seams are so much contorted as to be found at various angles with the horizon, the cleavage plane invariably maintains an angle of 37° to a vertical line, from which it may be inferred that the property of cleavage was impressed upon the rock subsequent to its disturbance from the horizontal position. Where the rock has been least disturbed from the horizontal position it is more easily quarried, and yields better slates. In some instances a space, which must originally have measured several feet, has been compressed into a few inches, and yields an inferior quality of slate. Thin strata of a peculiar character are occasionally met with. These the quarriers call "bands." They are from a quarter of an inch to a few inches in thickness, are harder that the general mass, have a different cleavage plane, are much more thickly studded with cubes of iron pyrites, and form a sort of selvage on the slates. In both of the Easdale slate seams there are beds composed of irregular nodules, half slate, half limestone. These are continuous, accompanying the slate in all its undulations; some have a curved cleavage, while the fracture of others is conchoidal. Round these the slate bends like wood round a knot. A well-defined stratum of the character described appears to occupy such a position as to justify a division of the slate deposit into an upper and a lower seam, as represented in the annexed section. The slates of Easdale

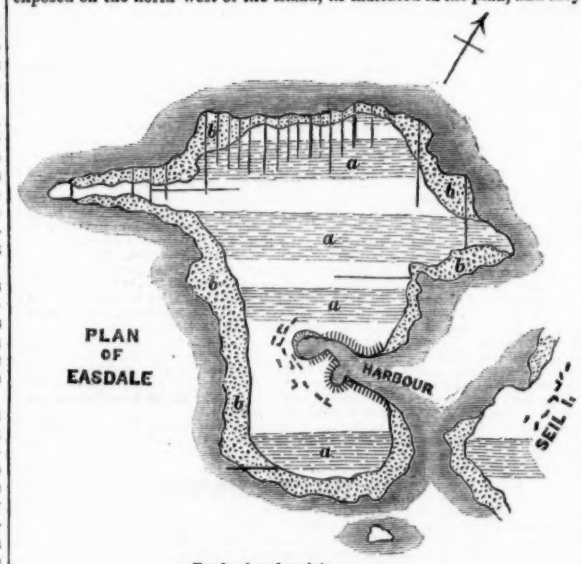


A Lower slate seam.
B Upper slate seam.
xxxx Nodular band.— — Hypothetical continuation.
------ Hypothetical continuation of slate.

are much affected by what the quarriers call "cuts." These are joints which intersect the strata in nearly a vertical direction. Some are found to extend from the surface to the greatest depth reached, while others pass only through a few beds. The greater number, however, appear to be confined to one stratum. Where the rock is thus divided into lengths of a few feet it is more easily quarried; for, although at the cuts it does not seem to have ever been completely separated, it parts readily, in much the same way as a sheet of glass does after it has been run over by the glazier's diamond.

The prevalence of these peculiar joints appears to be in some way connected with the quality of the slate, for in the finer grained they are most abundant. Their too great prevalence, however, is, in some instances, a source of loss. For example, in the principal quarry, the seam is crossed by a band a few feet in width, so cut into strips, or fragments, as to be quite useless. Altogether independent of the cleavage planes, but nearly parallel with them, there are other joints similar to the cuts. These appear to have resulted from upthrows and downthrows, and may be regarded as slip-joints. They not unfrequently contain clay, or the abraded matter of the rocks in which they occur. What the quarriers call "skew cuts," differ from any of the joints noticed. Like the slip-joints, they pass through the strata in a somewhat slanting direction. Their effect upon the rock is most injurious, rendering it coarse and friable in their immediate neighbourhood.

Where trap-dykes intersect the strata, their metamorphic effect is very striking. A dyke a foot or two in thickness affects the slate on either side for several feet to such an extent as to divest it in no small degree of its schistose character, and render it economically worthless. There are on the island two distinct sets, or systems, of dykes of different ages, the older being felstone, and the newer consisting of varieties of greenstone and basalt; the former have a bearing from north-east to south-west, the latter run at right angles with these, and are intersected by them where they are observed in junction. Of the newer group there are upwards of twenty exposed on the north-west of the island, as indicated in the plan, and they



a. Bands of roofing slate.
b. Beach covered with slate fragments.
—— Trap dykes.

vary from a few inches to 20 feet in thickness. One of the largest crosses the island near the centre. Although all more or less augitic in their composition, they vary in their mechanical structure, some exhibiting a close-grained and flinty fracture, while others are granular, and not a few porphyritic. Exposure to the atmosphere has had so little effect upon the more highly silicated varieties, that they stand out in bold relief like walls, while the more earthy have mouldered away several feet below the surface.

The greater number appear to have been produced by a single outburst but it is evident that several of the larger ones have been formed by successive eruptions, as they consist of two or more veins lying side by side, and differing in structure and colour; while a remarkable warty structure exhibited by a felstone dyke appears to favour the idea that it had been partially fused subsequent to its original formation. As a matter of course, these trap-dykes are all newer than the strata they intersect, and fragments of slate are occasionally found embedded in them. Slips do not seem to have resulted from the disturbing force by which the crevices containing these dykes were produced, the original level of the opposite walls being apparently undisturbed. The normal colour of the felstone dykes varies from a light cream colour to pale greenish grey, but long exposure to the atmosphere has darkened their exterior considerably. They affect the contiguous rock much in the same way as the greenstones and basalts do. It could hardly be expected that the Easdale rocks have yielded contributions to the cabinet of the palæontologist, but the scientific world has already been apprised of the fact that, a few years ago, a fragment of coal about 6 in. long, by 3 or 4 thick, was found inclosed in the slate at a depth of about 120 ft. from the surface. It was rounded as if it had been water-worn, and coated with a white unctuous clay. A portion of it was submitted to Prof. Nichol, of Aberdeen, who pronounced it pure coal of coniferous wood. It would evidently be rash to conclude that this coal was formed contemporaneously with the rocks in which it was enclosed, as the various movements by which they have been effected may have afforded it an entrance to the cavity in which it was found.

Our Ancient Tin Trade.—At the Christmas entertainment of the Southampton Polytechnic Institution, given at the Royal Victoria Rooms, Colonel Sir Henry James delivered an interesting address on the Ancient Phœnecian Tin Trade, of which the following is an abstract:—He said it had been a matter of discussion for many thousands of years, since the days of Herodotus, as to the direction in which, and the place from whence, the ancients obtained their supply of tin. In the earliest accounts the Phœnicians were said to have passed through the Pillars of Hercules, or the Straits of Gibraltar, in order to search for the tin islands, and it was also stated that the tin came from a place of six days' navigation. A more detailed account was furnished by Diodorus, who, are giving a description of Britain, tells us that it is these people who raise the tin, which they cast into a certain form, and afterwards carry it to an island which has this peculiarity—that it is an island at high water, and peninsular at low water; then they embark it, and take it to Gaul, after which they carry it 30 days on horseback to the Mediterranean. As there is no other place but Cornwall where the tin is found, they knew that is the spot to which all these observations refer. Translators, however, had erred in describing the form in which the tin was cast as being in the shape of cubes or dice. About 50 years ago a block of tin was dredged up in Falmouth Harbour (a model of which was exhibited), flat on one side and curved on the other, with a portion cut out at either end, thus forming four points. It had been described as a double canoe, a butcher's tray, and all sorts of descriptions had been given to it; but it was proved that this block of tin was one of the identical blocks cast in the form described. He had no hesitation in stating that St. Michael's Mount answered the description of Diodorus in every possible degree. At high water it was surrounded; at low water there was a roadway across, on which a friend had told him he had driven a conch and four, and to this day the tin obtained from that island was brought across in carts for embarkation. When they came to put the facts together they would find, in the discovery of this block of tin, a wonderful confirmation of the fact that this was the place referred to. Sir Henry referred to other facts, with a view of establishing the identity of the locality with the descriptions of ancients, and at the conclusion of his address he was loudly applauded.

THE TIN TRADE, AND ITS PROSPECTS.

[FROM A CORRESPONDENT.]

The actual price at which a commodity is sold is called its market price. It may be either above, or below, or exactly the same with its natural price. The market price of every commodity is regulated by the proportion between the quantity brought to the market and the demand of those who are willing to pay the natural price of the commodity, or the whole cost paid to bring it thither. When the supply of any commodity falls short of the actual demand, competition will immediately begin amongst those whose necessities oblige them to purchase it; and so the market price will rise above the natural price, according to the extent of the deficiency. Again, when the quantity brought to market exceeds the effectual demand, the market price will sink more or less below the natural price, as the greatness of the excess increases. And, lastly, when the quantity brought to market is just sufficient to supply the demand, the market price is identical with the natural price. It would be well if these fundamental laws of commerce were more clearly understood by those who are continually harping on the idea that the price paid by the purchasers of mineral produce is regulated entirely by private influence. The present depressed state of our Tin Market so seriously affects the interests of our Cornish mines, that it is well to enquire into the causes which have produced this result—a result over which neither miners nor smelters in England have had any control. The tin supplies from Cornwall have for some years past been continually increasing, and at no time in the history of Cornish mining has the yield of black tin from that source been greater than during the year 1863. A glance at the mining districts of the West will show what a number of mines formerly yielding copper are now almost entirely yielding tin. For example, the long-notorious district of Camborne, from which have been disembowelled many millions worth of copper, when the depth of the mines was insignificant, and entirely in the superstratum of killas rock, have during the last few years, and since they have penetrated into the underlying granite, yielded almost greater profits in tin. And from this one district of Camborne alone we may almost confidently expect a continuation of the present quantities returned, and even of larger supplies; for when these mines, situated on the great Dolcoath run of lodes, are once worked to a sufficient depth we may, so far as the knowledge of man is permitted to penetrate the centre of the earth, foretel an equally brilliant future for them as has been the lot of their more fortunate neighbours. Other districts, for a long time neglected, are now being re-worked, and are yielding vast quantities of tin. The mining world will not readily forget the excitement created when it was announced that Great Wheal Vor was to be drained and set to work. On this scheme a vast sum was expended, without any adequate return, but to the interest created by the revival of the old mine may be attributed the discovery of the Wheal Metal and adjoining lodes, the richness of which has far surpassed the expectations of the most sanguine. In the same district are many other prosperous mines and most promising undertakings, some of which deserve peculiar attention, from the very inviting character of the setts. The new mine of East Fortune is situated on a spot which it is almost surprising has not been tried before. The whole surface of the ground in the neighbourhood has been trenched and streamed for tin more than 100 years ago. To the antiquity of these diggings the brushwood which until lately has covered the surface of the ground testifies. The owners of the soil have handed down the tradition from father to son of the richness of the ground in tin. Can anything be more promising than the fact that there are several strong lodes, and innumerable strings of oxide of tin, to be seen here converging to one point, and all occurring in the same congenial rock as that of Wheal Metal and adjoining mines, the principal lode of the former of which passes through the sett. These conditions, so analogous to those under which Great Wheal Vor proved so remunerative, warrant the expectation of like profitable returns; and, since the productiveness of the veins increases as the workings advance towards the conjunction of the lodes, a large and rich lode when that point shall be reached may confidently be looked for. St. Just is at the present moment one of the most promising tin districts in Cornwall, and one gradually improving in prospects. It must not be forgotten here to mention the St. Day United Mines as the richest in Cornwall in return of tin at the present time. It would, however, be foreign to the purpose to mention in detail, or even enumerate, all the rich tin mines of the West, the object being merely to prove that the production of English tin is materially increasing, a fact to which the monthly returns give abundant testimony, and from which we find that our mines have yielded in 1863 more than 1000 tons of black tin in excess of 1862, and that the returns of 1862 exceed those of 1861 by a similar amount. So much for the state of our home production; and, on examining our foreign sources, we shall find the same tale told by them. The report of a diminished yield from the Banca mines is stated to be without foundation, and the produce of this year exceeds the average produce of many years past. At Billiton and Singapore, the sources of tin are nearly inexhaustible, and from Borneo we hear of the discovery of immense deposits of tin ore, but of which as yet we have received no certain account. The Republic of Bolivia, in South America, sends annually to Europe nearly 1000 tons of tin ore and metal. North America lays claim also to our notice as a tin-bearing country. In truth, whether we look at home or abroad, the fact presses itself upon us that our supplies of tin have greatly increased during the last few years, that they are at present increasing, and that they are likely to increase still further.

Commercially, tin in its pure metallic state is not much used, as it is only sold in that condition either in the form of tin-foil or amalgam. The principal uses of tin are in making tin-plate and alloys, of which those with copper, as bronze, bell metal, and specula metal, are the most important. In the manufacture of tin-plate—that is, in the coating of sheet-iron with tin, by far the largest proportion of our black tin is consumed. The process by which this is accomplished is almost entirely monopolised by England, who supplies nearly the whole of the civilised world with this article of commerce. The proportion of this tin-plate consumed by the United States of America is from one-third to one-half of the total amount

produced in England. It will not, then, be difficult to account for the depreciation in value of tin which has taken place during the last three years, and since our trade with America has been impeded by the civil war which has raged there. Throughout the whole of this period—since the spring of 1861—comparatively small purchases have been made in England for the States, and the Americans have been drawing entirely on the stocks previously accumulated in New York. Now that the supplies there have become exhausted, large shipments are being made to America; it cannot, however, be denied that the struggle raging between the Northern and the Southern States has crippled this branch of our tin trade.

In the early part of last summer the price of tin became so much firmer, on account of the large quantities of that metal sent to Japan for the manufacture of the new Japanese tin coinage, that an improvement in the market was confidently predicted. Before, however, the summer was well advanced an unfriendly feeling was manifested by that country towards England, which resulted in open war, and effectually put a stop to the importation of tin, and the price of that metal in Europe consequently returned to its original low figure. It is clear, therefore, that if the views here propounded be correct, the depreciation in the value of tin has arisen from causes on which individual speculators have had little more than an infinitesimal influence—causes, in fact, which have operated partly in the way of increasing the supplies, and partly in the way of curtailing the demand. But though these causes, so far as we are concerned, are not fictitious, and, therefore, do not lie within the reach of any remedy which we can apply, there is strong reason to believe that the march of events will in due time remove them, and restore the tin market to what may be termed its healthy normal state.

COPPER MINING IN SOUTH AUSTRALIA.

[Complimentary Dinner to Mr. ALFRED HALLETT, Manager of the Worthing Mining Company, Limited].

As an expression of the feeling that a mark of appreciation was due in acknowledgment of the services of Mr. Alfred Hallett, manager of the Worthing Mining Company's Bremer Mine, the inhabitants of Callington and the neighbouring townships organised a committee for arranging a complimentary dinner to him, which took place on Nov. 5. Among those present were the Hon. the Treasurer, Messrs. W. Milne, M.P., W. Townsend, M.P.; J. B. Neales, M.P.; Alfred Hallett, John Hallett, G. White, W. Rounsevell, and others for Callington. On arriving at Nairne the party was met by Messrs. J. Johnston, J. R. Toll, E. Felgate, Sloggett, Ryder, Dr. Weld, and a number of influential gentlemen from Nairne, Mount Barker, and other places. A banner bearer the inscription "Success to the Bremer Mine, and long life and prosperity to the manager," floated in the breeze opposite the District Hotel. At Native Valley the procession was headed by a cavalcade of at least 200 horsemen, marshalled by Capts. Barker, Prisk, and Lean, while a number of carts and German wagons fell in at the rear. The imposing *cortège* now moved on to Callington, the band playing at intervals on the road. Having reached the hotel loud cheers were given for Mr. Alfred Hallett, and politely acknowledged. Prior to the dinner Mr. A. Hallett kindly conducted a few gentlemen over the aboveground works of the Bremer Mine, and explained the several processes to which the ore was subjected. At the dinner, at which about 200 persons sat down, the hon. the treasurer (Mr. J. Hart) presided, and near him sat Mr. Alfred Hallett (the guest of the evening), Messrs. Milne, M.P.; Townsend, M.P.; Neales, M.P., and others. The vice-chair was filled by Capt. Thomas Lean, of Kanmantoo.

The cloth having been withdrawn, the usual loyal toasts—"Her Majesty the Queen;" "The Prince and Princess of Wales, and the rest of the Royal Family;" "His Excellency the Governor," &c.—having been drunk, and enthusiastically responded to, the CHAIRMAN called for bumpers for the toast of the evening. He regretted it had been placed in his hands, as he felt he should fall far short of adequately proposing the toast. The gentleman whose health he proposed, and whom they had met to honour that night, was well known, not only in the district, but also throughout the colony. If they looked around that neighbourhood they would see many of the results of Mr. Hallett's energy and talents. Few men would have persevered against the difficulties he (Mr. Hallett) had had to contend with as he had done to bring the mine to its present state. When they considered the number of men employed in the mine, and the large population which naturally collected around it, he was sure the energy and perseverance of Mr. Hallett deserved all their thanks. He was glad to be there to pay honour to a man who had given such advantages to the district. Not only there were the effects of Mr. Hallett's great perseverance likely to be felt, but in England the character of the whole district would be greatly increased. Nothing could serve the district better than to prove to the English proprietors that there was a mine there which could be worked with profit. Instead of laying out thousands they would be induced to lay out tens of thousands, which would be greatly to the advantage of the district. There could be no question that if they had a few men such as Mr. Hallett the mining interest would be in a far more prosperous state. (Cheers.) There were men who might be more liberal masters, but they lasted only for a short time; for when a man was unable to see his duty to his employer he would soon cease to be employed. Mr. Hallett was not only a good master, but also a good servant to his employers. (Applause.) It was now several years since mining was commenced in that district, but he believed no portion of South Australia was richer in minerals than that locality. All they wanted was well-directed capital to develope it. The Bremer Mine had been worked well, and in a manner which was an example to all miners. In all the mines he had visited he had never seen the operations carried on better than at the Bremer. They saw the master-mind throughout, whether in the smelting, dressing, or underground works. But, after all, when they saw such a demonstration as was witnessed that night, it showed that, independent of his management of the mine, he had so conducted himself as to win the affection and respect of those under him. (Cheering.) He now called on them to respond to the toast of the evening—"Mr. Alfred Hallett, our guest; and long may he live to work the mine, and be able to declare large dividends."—The toast was drunk with applause.

Mr. ALFRED HALLETT, who, on rising to respond, was received with applause, said that it gave him great pleasure and satisfaction to receive the compliment of the neighbourhood, and also those gentlemen who had come from town. He felt it a great compliment, because he had done nothing more than his duty. If in doing that he had promoted the welfare of the district, he was gratified; at the same time, though they had drunk his health so cordially, yet there were others in the district who also deserved praise. Other mines had striven on against similar difficulties as he had experienced, and to them some honour was due. He should not have been able to do much single-handed, and he was happy to say he had been successful in obtaining faithful officers. He always endeavoured to treat them in a manner which would induce them to do the best for their masters. He was glad that evening to see some around him who had been with him since the commencement of the mine. (Cheers.) He was glad to allude to this, because though he might sometimes be considered close, yet they were willing to serve him. There were several he saw also who had left him with a view to better themselves, but who had returned to him again. (Hear, hear.) There was a necessity in works of magnitude to keep an eye upon the future welfare of the concern, and if they could not pay their way they must soon come to a standstill. Such being the case, he had been closer than his natural wish would have led him to be. For three years he had worked the mine without a penny capital, during which time he had very heavy personal responsibility; but he knew the value was in the mine, and that he should be safe in taking the responsibility upon his shoulders. The circumstances of the mine were pretty well known in the district. The average of the ore was very low—11 per cent. He had, however, very great pleasure in being able to say, that after the expenditure of 76,000*l.*, which the total cost-sheets showed, and for which the shareholders had not yet received a penny, he could see for two years at least a profit for the outlay. After valuing the reserves on hand, and the machinery on the mine, he was glad to say that though the shareholders had received no remuneration, it would realise three times the amount of the outlay in cash. (Cheers.) There was no question that the success of the mine was brought about by the adaptation of machinery and by economic working. He had no hesitation in saying that were they only to convert the best ores into money the mine would not exist three months; but it was by the combination of machinery with the dressing of the poorer ores as well, that the mine had been brought on. It would be only right to allude to some of the discouraging circumstances under which he had laboured. Time after time, when he had seen success almost within his grasp, copper had decreased in value, but he was glad that the value of copper was now increasing. He had been considered an enthusiast, and by some, perhaps, supposed to be rather mad, in sticking to a thing which had not, and, according to the general account, could never pay. But he had been inspired by motives beyond these—by a hope for the future, and by a desire for the welfare of the district. He was in the colony in 1845, when the Kapunda and Burra Mines were discovered. South Australia was then at an exceedingly low ebb, and there was no money to give employment to the population. On the starting of the Kapunda Mine, however, closely followed by the discovery of the Burra, the whole face of the colony was changed. Farmers were enabled, when not engaged on their farms, to cart at remunerative prices. It was seen then that South Australia must depend upon her mineral products. At that time it was very easy to perceive that the agriculturists would soon grow more produce than was required for the wants of the colony. It was different, however, with mineral products, for they could not have too much of them, and miners were capital customers to the merchants and shopkeepers, and every branch of trade and commerce. This had been one of the moving springs in inducing him to work almost against hope. He had persevered in the mine, and he was glad to see so many there that night to congratulate the shareholders upon the reward of their labours. He was glad to see them around him, for he thought there should always be a good feeling existing between the employers and the employed. He always had endeavoured to benefit the district, and the demonstration they had honoured him with that evening would create a desire in him to do more for their advantage than he had hitherto done. (Loud cheers.)

Dr. BLUE gave "The Parliament of South Australia," whose efforts, he thought, were beyond all praise. They stood out in bold relief in comparison with the Legislatures of the other colonies. The grant of additional territory to their colony appeared to be a bone of contention between them; but the much-talked-of recess, he hoped, would enable the Government properly to consider and discuss the matter. The mineral laws would occupy the attention of Parliament, and he hoped the view of Mr. Neales, who had been a steady advocate of their interest, to place mining within the reach of the poor man, would be carried out. The toast was appropriately acknowledged by the Chairman.

Mr. J. R. TOLL proposed "The Mining Interest of South Australia." The fact that nearly all present were engaged in mining he thought was sufficient to commend it to them. He believed if the proprietors of mineral lands were a little more liberal the interest would advance more rapidly and substantially.——Mr. J. B. NEALES, M.P., responded on behalf of one of the greatest interests in the colony. He was a miner born, a miner bred, and a miner he intended to die. (A laugh.) He was a miner when he came to the colony 26 years ago, and he could only say that anyone who spoke disloyally of that interest the sooner he was sent to the northern territory the better. (Laughter.) He had not been able yet to bring public opinion to what he thought it should be with regard to mining, but he attributed that to their ignorance of the subject. (Laughter.) When they saw in Cornwall 800,000*l.* paid for labour, 100,000*l.* for timber, and 50,000*l.* for gunpowder, they must see the importance of the interest. Yorke's Peninsula, the Burra, and Kapunda might be made a Cornwall five times over. They could command any quantity of exports, and they had the world before them. They could never produce more than was wanted. He would advise them still to stick to it, and insist on the landlords lowering their royalty. (Hear, hear.) If any of them had any grievance they had only to send it to him, for his office was only open for that purpose, and he would attend to it for them. (Laughter and cheers.)

Capt. BARKER gave "The Agricultural, Commercial, and Pastoral Interests," which having been responded to, was followed by another by Mr. BEE—"The Members of the District," to which Mr. W. MILNE, M.P., and Mr. W. TOWNSEND, M.P., responded. Mr. W. MILNE then gave "The Town and Trade of Callington." He did this with pleasure, as he had been acquainted with it from the time it was commenced. He remembered the first mineral discoveries, and nothing had conduced so greatly to the success of the district as the mine which had been so ably conducted by Mr. Hallett. In proposing the toast, he felt he was really proposing success to the Bremer Mine, as on that the prosperity of the district depended. He had known the Messrs. Hallett for many years, and he was pleased at their perseverance and enterprise in developing the mineral resources of the colony. Nothing afforded him greater pleasure than the emphatic statement that the shareholders now had some chance of a dividend. He was delighted to find on the road up that there was a prospect of good crops, as it would inspire the farmers with hope.—In responding, Mr. HENRY JACKSON said he was present at the laying out of the township, and remarked that the prosperity of Callington was the result of the persevering labours of their guest—Mr. Alfred Hallett.

The CHAIRMAN next gave "The health of Mr. John Hallett, and the Committee of the Worthing Company." He must say that the committee had worked the mine with discretion, and in a manner which merited success. He had known Mr. Hallett for 26 years, and he could say he was a gentleman who had done much for the prosperity of the colony. He was sure they would heartily join with him in drinking the toast in a bumper.

Mr. JOHN HALLETT, who was received with loud cheers, acknowledged the toast. He was pleased to meet so large and respectable a company, many of whom he was acquainted with. He had been long in the colony, and hoped he had not spent his time in vain. The honour they had paid him he fully appreciated. He thanked them on behalf of the committee for the sympathy they had expressed, and he was glad to hear willing testimony borne to the indomitable perseverance of his brother, who was really the working principal in the mine's affairs.

"Lady Daly and the Ladies of South Australia" was given in eloquent and appropriate terms by Mr. W. TOWNSEND, M.P., and acknowledged by Mr. JOHN LANE.

The VICE-CHAIRMAN gave "The Bremer Mine and the Worthing Mining Company." The mine was the life of the district, and, therefore, they could not be too thankful to the company and to Mr. Alfred Hallett, for had that gentleman stopped it would have been a death-blow to Callington, and a great injury to all of them. He understood that all the capital was expended 18 months ago, but that Mr. A. Hallett, seeing he was on the eve of an important discovery, continued the working on his own responsibility.

Mr. ALFRED HALLETT responded. He appeared before them now as a shareholder, in which position he had been able to realise the disappointment which was felt by the English shareholders at their want of success. The event that evening would, however, give the shareholders the greater confidence in the mine. He wished before setting down to propose a toast. He saw a number of gentlemen from other mines in the neighbourhood, and he would, therefore, beg to propose "Success to the surrounding Mines."

In reply to the toast, "The Visitors," coupled with the name of Mr. G. Dibbs, of Sydney, Mr. DIBBS said he was interested to some extent with the mining interest in another colony. The coal interest of New South Wales and the mining interest of South Australia would, he was sure, be greatly benefited by mutual support and encouragement. Strikes had frequently occurred in that colony, but he had not yet heard that they copper miners here ever turned out on strike, and he should be glad to speak of that meeting when he returned.

Several other toasts having been given and responded to, the very interesting meeting was brought to a close, a meeting alike creditable to the inhabitants of the district, and gratifying to Mr. Alfred Hallett, and all to whom that gentleman may be known.

THE MINES OF CORNWALL AND DEVON.

An important addition to our mining literature has just been made by Mr. Thomas Spargo,* whose name is already known as the author of some practical remarks upon mining enterprise in Cornwall and Devon. Mr. Spargo tells us that he has sought by unremitting trouble and attention, involving a considerable expenditure of money, to obtain the most perfect information upon this important subject, and the extent to which he has carried his researches will be judged of when it is stated that he has succeeded in bringing together concise historical and general notices of upwards of 600 mines, supplying such particulars with reference to each as is likely to prove interesting to the capitalist already embarked in mining enterprise, as well as to those who may be seeking a profitable channel for the investment of spare capital. As the principal object in referring to works of a similar class to that before us would be to ascertain the mines surrounding any particular property to which attention was at the moment directed, Mr. Spargo's arrangement of the mines according to their position, instead of alphabetically, will be very generally appreciated.

Commencing with the Land's End, Mr. Spargo gives the details of the several districts which would be successively passed through in a journey thence to the county of Devon. After an introductory chapter on Cornwall, in a mining and geological point of view, he divides the county into thirteen mining districts, each, as he remarks, having sufficient peculiarities and demarcations to render it distinct in itself. The first is the Penzance district, extending from the Land's End to Marazion, including the seaports of Penzance and St. Ives, and chiefly yielding tin, although much copper is gotten in its western extremity from under the sea, and some considerable quantity in the slates to the eastward, near Marazion. The next are the Redruth, Helston, and Falmouth districts, the latter famed more for its product of granite than for metals. Redruth, the next mining centre, is an ancient tinners' town, while four miles to the west of it lies Camborne. The chief feature, he observes, in this group of districts, is the Carn Brea Hill, rising 370 feet above the sea, and whose base is surrounded by more copper than any other mountain, perhaps, in this or any other county. Then come in, moving eastward, St. Austell, famous for its china-clay works, and St. Columb, less highly productive of mineral. In the next advance comes Bodmin, apparently having great geological distinctions formable to nature, which have been only partially realised. Camelford and Liskeard are the next divisions. In the latter, the skilfully-worked mines of Fowey and Par Consols are found, and Hingston, Launceston, and St. Germans form the frontier group on the borders of Devonshire, in which is found Devon Great Consols, the most productive and wonderful copper mine in the world.

In concluding his chapter on mining, as a legitimate investment, Mr. Spargo states that, up to the end of 1862, 93 dividend mines in Cornwall show that upon an outlay of 1,497,907*l.*, dividends amounting to 5,262,275*l.* have been paid to the adventurers, whilst the intrinsic worth of the properties was 2,887,736*l.*, and these results are only the contributions to the great mining fund of the kingdom from one district of the county of Cornwall alone. The whole of the copper, tin, and lead mining districts would give a total amounting to something enormous. Alluding to the Devonshire district, he observes that the Dartmoor tin districts are all thickly studded with good mines; the mining chart is getting fuller every day, and the mines getting richer, its position being so permanently established that its foundation can never be shaken. Finally, "he entreats attention to the fact that nothing in the intrinsic or national value and capabilities of a country is of so much paramount benefit as its mineral fecundity, and so largely and quickly conducive to its increase of population, wealth, and civilisation, or so fostering and impulsive in its influence upon the progress of its commerce, manufactures, and arts." He observes that every ton of mineral raised is so much gained and added to the previous wealth of the community. Occupation has been given in the raising and preparation of the ore, and in the smelting and conversion of the raw material into a refined metal, giving rise to various changes and adaptations of the chemist, the engineer, and artizan, for accelerating the advancement of manufactures and occupations, and ministering to the requisites, comforts, and services of social improvements.

From the several quotations which we have made from the book, its general character will be readily judged of; it will, therefore, be necessary only to observe that the narrative is amply illustrated by maps and plans of the various districts referred to, most of them being well coloured, to distinguish either the nature of the ground or the boundaries of the districts. First, there is a small map of the county, showing its divisions; then a geological and parish map of the St. Just, St. Ives, and Penzance mining districts, and similar maps extending from St. Agnes Head to the Lizard Head, and from Padstow to Truro; whilst another shows the eastern part of the county. Plans of districts and sections are also given, which raise the number to 18, so that it would be difficult for a reader to consult it without obtaining the information he seeks.

* "Statistics and Observations on the Mines of Cornwall and Devon, illustrated by Maps, Plans, and Sections of the several Mining Districts in the Two Counties." By THOS. SPARGO. London: Author, Gresham House.

URE'S DICTIONARY OF CHEMISTRY.—The eleventh monthly part of Mr. Watts's new edition of this dictionary has now been issued, and reaches to the article called "Gallotannic Acid." The style in which the various articles are written is excellent, and although we still regret that the new system of notation was adopted in a work so eminently calculated for a work of reference for practical men, articles have now been published in it which, if carefully studied, will remove the chief inconveniences which the reader will have to encounter. In the sixth part, for example, there is an admirably written article on "Classification," by Mr. Foster, which will afford material assistance, and early in the seventh part is another, on "Copulated Compounds," by the Editor, which is equally valuable. Although we have objected to the unitary system of notation, on the ground that at no distant period it may be proved altogether empirical, it should be remembered that the theory is a very interesting one, and by no means difficult to master. The articles, "Coal Gas," by Mr. A. W. Wills, of Wolverhampton, and "Cobalt and its Compounds," by the Editor, in the sixth part, are excellent, as also is that on "Cæsium, by Mr. Foster. In the seventh part, the information under the head of "Copper," by the Editor, is almost entitled to be called a treatise on the subject. The article on "Crystallography" is also as complete as could be wished for; and that on "Electricity," which occupies the last ten pages of Part 8, and the first hundred of the following number, is a complete review of the history and progress of the science. The tenth part is occupied principally with organic chemistry, and therefore contains much with which the readers of the Journal are less closely connected. In Part 11 is an article on "Rational Formulæ," by Mr. Foster, well worthy of study, and that on "Fuel," by Dr. Paul, gives evidence of considerable research. Dr. Paul has furnished ample particulars to enable the practical man not only to judge which is the richest coal, but which is the best adapted to the particular purpose for which he may require it. In referring to the first number of the Dictionary issued, we observed that, judging from the part before us, the Dictionary of Chemistry would be one of the best in existence, and now that eleven parts have been published we are thoroughly convinced our anticipations will be realised.

WATER SUPPLY AND SEWERAGE.—If there be any proposition connected with this subject in which the philanthropist would be likely to take an interest, it should certainly be the Water Supply and Sewerage of Jerusalem, for concerning that city so undoubted an authority as Prof. Downing observes that "he had no idea of any city in the world being in so unfavourable circumstances as to water supply as Jerusalem is—over 2000 ft. above the sea, on a porous limestone soil, without any river or stream contiguous, no fuel to work a pumping-engine." Surely, if this be not a good field for testing the ingenuity of an engineer it would be difficult to find one. A handsomely printed volume has just been issued at the expense of the London Syrian Improvement Committee, containing the details of the plan proposed by Dr. J. Irvine Whitty, C.E., for improving the sewerage, and providing an ample water supply, by re-modelling Herod's Aqueduct from the Pools of Solomon to the Jaffa Gate of the City of Jerusalem, and by constructing egg-shaped sewers from near the Damascus Gate along the street through the Mahomedan quarter to the intersection of the David-street, and thence to the King's Gardens, by way of the Mucaribeli Gate, and the declivity near the Pool of Siloam. Dr. Whitty estimates that the construction of this sewer would cost 898*l.* 2s. 6d.; he proposes also to make repairs and enlargements of the cistern outside Damascus Gate at a cost of 230*l.*; the formation of drains for supply of same Pool of Bethesda, Birket-el-Hejjeh, and Birket Hammam Sitte Myriam, 400*l.*; ditto for supply of Upper Pool of Gehon and Pool of Hezekiah, 720*l.*; and the re-modelling of Herod's Aqueduct by putting in 9-in. iron tubing 2 ft. below ground, 6231*l.* 10s. = 8479*l.* 12s. 6d. Considering that the population of the present city of Jerusalem exceeds 20,000, and that the carrying out of the proposed plan would render the city of greatest possible historical interest a wholesome and beautiful resort for the traveller, and confer a lasting benefit upon the Mahomedans, and thus create a better feeling between them and their fellow-citizens of different religious opinions, the project may be regarded as one which is sure to find supporters, more especially as the demand for manure is one which is continually increasing in all parts of the universe. Dr. Whitty in his interesting work gives ample data for proving that his conclusions are drawn with care and accuracy.

"THE DERBYSHIRE RED BOOK."—The edition for the current year of the annual bearing this title has just been issued. The same care and attention has evidently been paid to the compilation of the work as has gained so high a reputation for the previous editions. Every conceivable information likely to be required by the gentry and others connected with the county will be at once found in the Red Book. The whole of the usual memoranda given in a calendar are supplied, and particular attention is given to the peerage, baronetage, clergy, &c., lists, as well as to the meetings of foxhounds, scientific and other associations, benevolent and religious societies. The masonic information for the province, comprising the new members, places of meeting, and names of the masters for the current year, as well as every necessary particular relating to parliamentary affairs, city, and borough officers, and other local data, are correctly given, so that the book cannot fail to meet with numerous supporters. It is as cheap a shilling's worth as need be desired.

"POST MAGAZINE ALMANAC."—The edition of this well-known almanac has just been issued for the current year. As an insurance directory the "Post Magazine Almanac" is unsurpassed; the list of Chairmen, deputy Chairmen, and directors of all the life and fire insurance companies in the United Kingdom being particularly valuable. The Almanac is also unusually full with ordinary calendar matter, and cannot fail to be extensively patronised.

SALES OF LEAD ORES.

LEAD ORES SOLD FOR THE QUARTER ENDING DECEMBER, 1863.

Mines.	Tons.	Amount.
Minera	1551	£21872 16 6
Isle of Man	500	10311 15 0
Talargoch	475½	7228 0 6
Frongoch	442	5798 17 0
Wheal Mary Ann	202	4619 10 0
Dyliffe	309	4184 14 0
Great Laxey	200	4050 0 0
East Darren	227	3732 2 6
Macsysaft	245	3313 7 6
Cwmystwith	240	3133 10 0
Cwm Erfin	180	3069 0 0
Wheal Frank Mills	230	2922 10 0
Cargoll	150	2315 7 6
West Chiverton	125	2102 0 0
Glogfach	120	1984 10 0
Bryn Gwiog	110	1551 10 0
Twelve Apostles	120	1542 10 0
Roman Gravels	104¾	1398 14 11
Dyfngwm	97	1299 12 6
Llanerchyraur	93½	1292 9 6
Hendre Ucha	124	1231 13 0
East Logylas	90	1205 15 0
Parry's	69¼	954 3 3
Llangynog United	70	917 16 6
Rhosesmor	69	884 17 0
Wheal Ludcott and Wrey Consols	50	876 5 0
Newtownards	63	856 16 0
Bryngwyn	42	854 17 6
Bronfloyd	50	702 10 0
Treweatha	28	631 8 0
Deep Level	45	605 5 0
South Darren	30	592 14 7
North Henblas	44	556 10 0
Goginan	31	550 8 6
Wheal Hope	30	549 0 0
East Jane	37¼	544 18 0
South Exmouth	50	531 5 0
Long Rake	38½	518 11 3
Westminster	36	511 4 0
Minera Union	33	457 10 0
Pool Park	30	441 0 0
Cwm Brane	35¾	437 2 11
Speedwell	31	404 14 6
Cwm Byr	27½	349 0 0
Bwlch-y-Plum	25½	347 7 6
Clwt Militia	23½	311 19 3
Pennant	21	292 3 6
Cefn Brwyno	21	288 15 0
Chware Las	20	284 15 0
Harwood	20	257 10 0
Summer Hill	18	231 4 0
Alt-y-Crib	13	185 6 0
Cae Conroy	13	183 19 0
North Minera	14	175 0 0
Nant-y-Iago	14	173 12 0
Pwll Clar	12½	160 4 9
Pant-y-Mwyn	13	160 4 0
Park	12	156 0 0
Fron Hall	11	145 13 9
Mount Pleasant	10	135 5 0
Aberdovey	8	102 4 0
Merilyn	7	94 3 0
Maudlin	7	90 6 0
Brynford Hall	6½	85 19 9
Treloggan	7	85 12 3
East Pant Du	6	78 0 0
BLENDE.		
Minera	387	£ 1521 5 6
South Lisburne	50	259 0 0
Roman Gravels	48½	169 15 0
SILVER-LEAD.		
Talisker	50	937 10 0

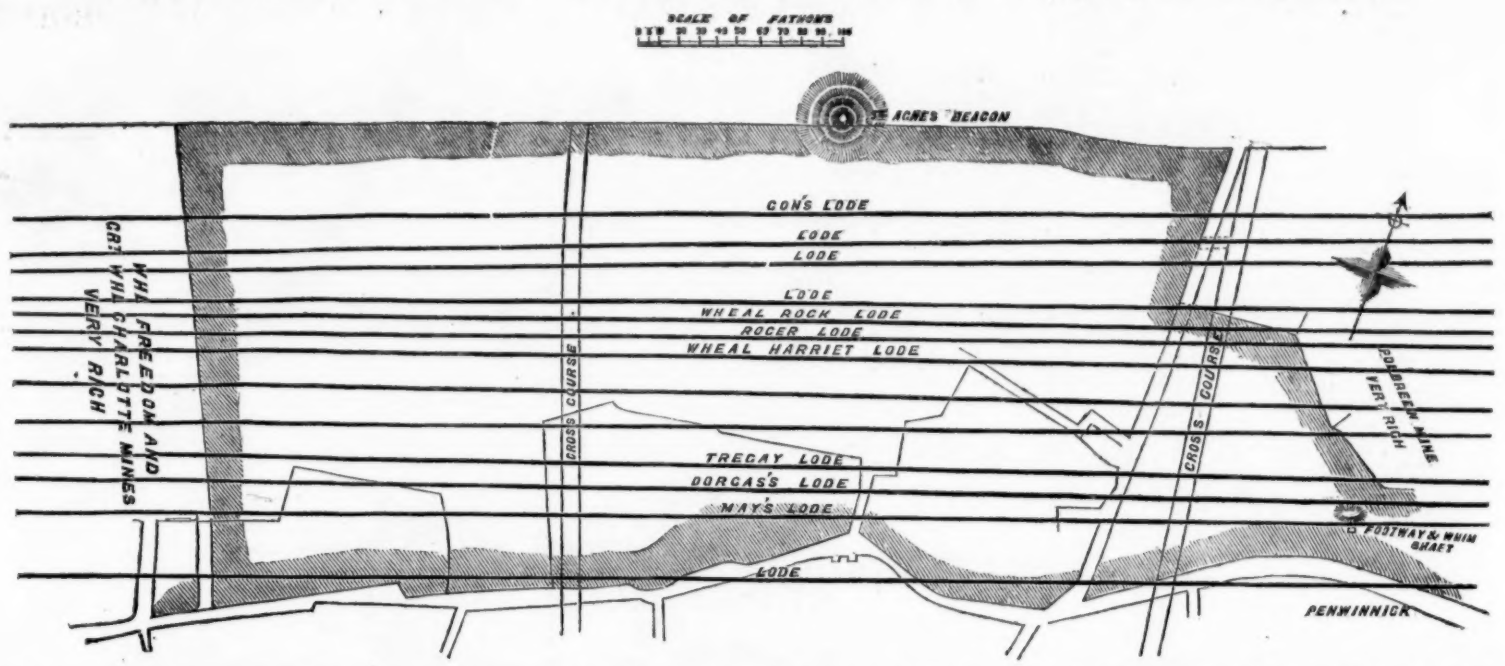
BLACK TIN.

BLACK TIN SOLD FOR THE QUARTER ENDING DECEMBER, 1863.

Mines.	Tons.	Amount.
Carn Brea	198	£12383 0 0
St. Day United	137½	8006 4 11
Tincroft	105	7000 0 0
Great Wheal Vor	98	6768 7 3
Par Consols	95	6345 9 3
Providence	83¼	5620 7 6
Wheal Uny	71¼	4432 7 10
Pedn-an-drea	59¼	3844 0 8
Wheal Kitty (St. Agnes)	58½	3840 10 3
Wheal Grylls	60¼	3795 13 1
St. Just United	46¾	3211 7 0
Great Wheal Busy	54	3187 0 9
Wheal Tremayne	40¼	2825 3 1
Prosper United	43	2796 13 9
West Fowey Consols	39¼	2527 6 2
New Birch Tor and Vitifer	30	1985 8 0
North Roskear	25¾	1654 15 1
South Carn Brea	25½	1572 8 1
North Wheal Robert	14	898 8 1
Pendeen Consols	13¾	878 6 6
Cuddra	13	855 0 0
Phœnix	12	772 12 0
Great Work	10½	758 11 8
Leeds and St. Aubyn	10½	695 7 0
Guriyn	10½	695 6 6
West Beam	9¾	658 10 0
Penhalls	9½	627 18 9
East Wheal Grenville	8½	589 11 6
East Wheal Lovell	9½	586 3 4
Cornubia	8¾	579 10 5
Wheal Harriett	6	532 10 6
Trevenen	6½	461 16 6
North Jane	5	297 19 3
Wheal Sidney	4	261 13 9
West Grylls	—	200 0 0
Wheal Par	2¼	152 3 6
Wheal Vyvyan	2½	151 0 0
West Wheal Kitty	2½	135 0 0
Retanna Hill	2¼	134 15 0
West Par	1½	67 9 1

CAPPING FOR RAILS.—As an improvement in the permanent way of railways, Mr. J. Edwards, of Basinghall-street, proposes to fix suitable iron arms to the sides of the rails; these arms are fixed by means of bolts, and nuts or bolts, and cotters; these bolts he sometimes makes hollow, to get extra strength; these bolts he applies to fasten fish-plates and other parts of the permanent way. Under the arms he places a wood or other sleeper; the sleepers pass between the stay and arms, which then hold them in position. Under the rail and inside the brace he places a filling piece of any suitable material. When he uses iron sleepers, which are made of angle-iron cut to length, he prefers to make the sleepers answer the purpose of fish-plates and sleepers combined: these sleepers sometimes he forms by carrying a thin plate of metal from arm to arm, and so save metal for the arms. He uses T-iron, with holes punched to get the bolts in, but he does not confine himself to this plan, as the arms can be formed in many ways; tie-bars of wood or metal are passed under and bolted to the sleepers. Also he applies a capping to the rails; this capping is rolled to fit the head of the rails, and is either bolted, sprung, or forced on. This capping takes the wear of the rails, and it is only necessary to renew the capping instead of the whole rail.

THE POLBREEN AND CHARLOTTE UNITED MINES, ST. AGNES.



At this season of the year, when most people are making up their accounts, and seeking for a favourable investment for their surplus funds, it is fortunate to be able to point out to our friends what we consider a most desirable enterprise. It is a part of our duty, exercised through the year, to cater for them in mining matters. We have this year to bring to their notice a rich piece of tin ground lying between Polbreen Mine and the Freedom and Great Wheal Charlotte Mines. This excellent sett for tin mining is situate in the parish of St. Agnes, and is an extension of the great Redruth district. It lies between the grants of very profitable mines, and the evidence amounts to little less than a certainty that it will prove a very great success. If we look at the progress of mining in this district, we shall find that half a century ago the Camborne and Redruth mines lay so far apart that few people dreamt that they were portions of the same thing. Now, by the extension of the workings at the end of these mines the two great ranges are united, and in the railway carriages you may pass from Carn Brea to Camborne without distinguishing one mine from the other. The shafts and engine-houses lie along the line promiscuously, as if it were only one range of mines. This proves that our notions of mining are often too limited, and our arguments on causation fail because they are not sufficiently bold. A man many years ago would have been treated as if his imagination had run wild had he ventured to predict with reference to the Camborne and Redruth mines what in our time has really come to pass. It would have been said that he was speculating too boldly, and that it was not likely the lodes would be so productive that the workings upon them would extend for miles through courses of ore, and yet this is now found to be the case. What has taken place in the Camborne and Redruth districts is only an illustration of a class of facts showing that frequently in the ground lying between rich mines longitudinally the lodes, if opened, would be found fraught with metal; and this is, no doubt, the case in the Polbreen and Charlotte United Mines. These mines lie between immensely rich deposits of metal; the rich lodes in either end run into this grant. They have been discovered, and at the surface sections where the metals and their mineralised representatives usually exist, more lightly and less solid than below, they have in this grant yielded very substantial quantities of ore. With these facts before us, it is impossible to come to any other conclusion than that the Polbreen and Charlotte United Mines, when fairly opened, will prove very rich mines. The ground is mineralised throughout; it can be worked to a good extent through the inexpensive medium of adit levels, which will not only yield profits, but prove that the bases of the lodes contain masses of ore that will render the mining of them a permanent source of profit for many generations, possibly, as long as man may hold dominion in this planet. We can conscientiously recommend these mines to the notice of the public. The district is full of good mines, giving very large incomes for inconsiderable outlays. The agent of the mines, Capt. Davis, states that without expending a single farthing on tutwork, or works of search, they had succeeded in taking away 80*l.* worth of tin from the ground left or neglected above them, which was sold, and 80*l.* worth more remained broken at the surface. This removes the speculative element from this investment, and shows that the metals are exposed and ready for those who invest to reap the benefit of their outlay. We strongly recommend these mines to our friends and the public, feeling quite assured that neither we nor our constituents will ever be sorry on account of our selection.

THE THIRTEENTH ANNUAL STATISTICS OF THE MINING INTEREST.

BY WILLIAM HENRY CUELL, ESQ.

TABULAR STATEMENTS, CONTAINING RETURNS OF ORE, &c., FROM DIVIDEND-PAYING MINES, FOR THE PAST YEAR (1863).

CORNISH AND DEVON MINES.

Shares	Name of Mine.	Amount Paid.	Market value.	Dividend per share.	Total Amount.	Metal.	Parish.	Purser or Secretary.	Address.	System.	Meetings, when held.	Copper.	Tin.	Lead.	Total Amount of Money.	Lease granted.	Dues.
		£ s. d.	£ s. d.	£ s. d.	£							Tons.	Tons.	Tons.	£ s. d.	In Years.	
4000	Bedford United	2 6 8	3 0 0	0 2 6	500	Copper	Tavistock	T. B. Laws	50, Threadneedle-street	Cost-book	Three months	2454½	—	—	10,975 4 2	1853 .. 21	1-12½§
1248	Boscaswell	6 15 0		0 15 0	936	Tin and copper	St. Just	S. York	Penzance	ditto		—	150		9,623 2 9	.. 21	1-24
200	Botallack	91 5 0	270 0 0	24 0 0	4800	Tin and copper	St. Just	S. H. James	Penzance	ditto	Three months	532	416		33,021 19 3	1859 .. 21	1-24 18
916	Cargoll	14 15 7	40 0 0	5 0 0	4580	Silver-lead	Newlyn	E. Michell	Truro	ditto	ditto	—	—	995¼	15,590 6 1		1-15
2900	Clifford Amalgamated	—	34 0 0	2 2 6	6162½	Copper	Gwennap	Williams and Son	Truro	ditto	Two months	14246			68,612 0 0		1-19
1024	Devon Great Consols	1 0 0	550 0 0	55 0 0	56320	Copper	Tavistock	A. Allen	Gresham House, Old Broad-st.	Joint-stock	ditto	26756	—	—	128,799 3 0	1859 .. 27	1-12
358	Dolcoath	128 17 6	600 0 0	47 0 0	16826	Copper and tin	Camborne	C. Thomas	Camborne	Cost-book	ditto	649	1026	—	73,032 3 11*	1849 .. 21	1-24
12800	Drake Walls	2 0 0	2 0 0	0 3 0	1920	Copper and tin	Calstock	R. Clogg	Liskeard	ditto	Three months					1861 .. 21	1-30
512	East Basset	29 10 0	58 0 0	10 0 0	5120	Copper and tin	Redruth	W. Richards	Redruth	ditto	Two months	1249	—	—	12,008 1 7†	1846 .. 21	1-16
6144	East Caradon	2 14 6	26 0 0	3 6 0	20275 4s	Copper	Linkinhorne	C. R. Norton	Salisbury	ditto	Three months	5911	—	—	34,114 10 4	1863 .. 21	1-20
128	East Pool	24 5 0	—	30 0 0	3840	Copper and tin	Illogan	W. Prisk	Camborne	ditto	Two months	3278	127	—	18,841 0 0‡		1-16
1906	East Wheal Lovell	2 13 6	9 0 0	0 7 6	714¾	Tin	Wendron	H. Rogers	Helston	ditto		—	45	—	2,873 0 10		1-18
5000	Frank Mills	3 18 6	—	0 1 6	375	Lead	Christow	C. Wescomb	Exeter	ditto		—	—	726	9,491 14 7		
1798	Great Wheal Fortune	31 2 7	19 0 0	2 15 0	4944½	Tin	Breage	T. W. Robinson	Hayle	ditto	Three months	—	448	—	32,632 8 8	1852 .. 21	1-20 18
5908	Great Wheal Vor	40 0 0	13 0 0	0 15 0	4431	Tin	Breage	G. Noakes, man. direc.	Gresham House, Old Broad-st.	ditto	ditto	—	348½	—	24,655 15 11		1-18
1024	Herodsfoot	8 10 0	39 0 0	5 5 0	5376	Silver-lead	Lanreath	T. Trevillion	Liskeard	ditto	Four months	—	—	686	15,333 14 2	25	1-15
9000	Marke Valley	4 10 6	6 0 0	0 6 6	2925	Copper	Linkinhorne	J. Harding	Salisbury	Deed of Set.	Three months	4966	—	—	16,189 7 9	1863 .. 21	1-18
6000	New Birch Tor & Vitifer	1 6 6	—	0 2 0	600	Tin	Nth. Bovey, Lydford	W. Thompson	2, Copthall Chambers	Cost-book	ditto	—	126¼	—	8,587 5 8	1851 .. 31	1-20
5936	North Treskerby	1 9 0	2 0 0	0 7 6	2226¼	Copper	Redruth	B. Matthews	St. Day	ditto	ditto	2322	—	—	10,634 10 0		1-20
6400	Par Consols	1 2 6	—	0 2 6	800	Copper and tin	St. Blazey	Major Davis, R.M.	St. Blazey	ditto	ditto	15580*l.*	20518*l.*	—	36,098 0 0	21	1-16
2000	Polberro	0 15 0	—	1 0 0	2000	Tin	Polberro	J. Taylor and Sons	Queen-street-place	ditto	ditto	—	205	—	14,059 0 0		
512	Polbreen	8 0 0	—	1 0 0	512	Tin	St. Agnes	dittc	ditto	ditto	ditto	—	55	—	3,809 0 0		
1120	Providence	10 6 7	42 0 0	4 15 0	5320	Tin	Lelant	S. Higgs	Penzance	ditto	ditto	—	341	—	22,785 15 2		1-22
6000	Rosewall Hill & Ran. Utd.	2 16 0	—	0 1 6	450	Tin	Towednack	T. Treweeke	Uny Lelant	ditto	Two months	—	113	—	7,365 14 9		1-20
512	South Caradon	1 5 0	420 0 0	29 10 0	15104	Copper	St. Cleer	T. Kittow	Liskeard	ditto	ditto	5838	—	—	53,474 0 1	1862 .. 21	1-18
512	South Tolgus	8 0 0	38 0 0	1 0 0	512	Copper	Redruth	J. Haye	Redruth	ditto	ditto	2491	—	—	13,496 0 0		
496	South Frances	18 18 9	65 0 0	6 0 0	2976	Copper and tin	Illogan	J. Lanyon	Camborne	ditto	ditto	£12,783	2175	—	14,959 3 6		1-15
940	St. Ives Consols	8 0 0	—	2 17 6	2702½	Tin	St. Ives	T. Treweeke	Uny Lelant	ditto	Three months						1-18
6000	Tincroft	9 0 0	18 0 0	2 10 0	15000	Copper and tin	Illogan	W. Teague	Camborne	ditto	ditto	£2439¼	25852*l.*	—	28,341 4 8§	1863 .. 21	1-26
6000	West Basset	1 10 0	12 0 6	1 7 0	8100	Copper	Illogan	W. A. Buckley	50, Threadneedle-street	ditto	Two months	5401	—	—	31,575 6 10	1852 .. 21	1-15
3000	West Chiverton		53 0 0	0 15 0	2250	Lead	Perranzabuloe	R. Clogg	Liskeard	ditto	Three months	—	—	890	15,093 17 5	1855 .. 21	1-15¶¶
256	West Damsel	38 10 0	—	2 0 0	512	Copper	Gwennap	G. W. A. Michell	Redruth	ditto	Two months	2243	—	—	8,311 3 7	1851 .. 21	1-18
400	West Seton	47 0 0	210 0 0	29 0 0	11600	Copper	Camborne	B. Matthews	St. Day	ditto	ditto	6346	—	—	34,539 4 7‖	21	1-15
512	Wheal Basset	5 2 6	90 0 0	4 0 0	2048	Copper and tin	Illogan	W. Richards	Redruth	ditto	ditto	2005	78	—	17,312 9 6	1850 .. 21	1-15
1000	Wheal Basset and Grylls	7 0 0	—	3 0 0	3000	Tin	Wendron	T. P. Tyack	Helston	ditto		—	284	—	17,661 18 3	1862	1-20
1024	Wheal Grylls	2 4 0	30 0 0	3 0 0	3872	Tin	Perranuthnoe	Dunsford & Ranken	Broad-street-buildings	ditto	Three months	—	213	—	14,157 4 9		1-18
4295	Wheal Kitty (St. Agnes)	5 4 9	7 5 0	0 5 0	10733¾	Tin	St. Agnes	E. King	Austinfriars	ditto	ditto	£246	213¼	—	14,497 12 1¶		
1024	Wheal Kitty (Lelant)	2 0 6	—	0 10 0	512	Tin	Uny Lelant	T. Richards	Camborne	ditto	ditto	—	129	—	8,703 13 0	1852 .. 21	1-15
4800	Wh. Ludcot & Wrey Con.	2 10 8	2 0 0	0 12 6	3000‡‡	Lead	St. Ive	J. Taylor	Liskeard	ditto	ditto	—	—	748	16,788 0 0**	1852 .. 21	1-12
896	Wheal Margaret	9 17 6	17 0 0	1 0 0	896	Tin	Uny Lelant	T. Treweeke	Uny Lelant	ditto	ditto	—	187	—	11,643 7 3	1861 .. 21	1-18
1024	Wheal Mary Ann	8 0 0	12 0 0	0 10 0	512	Silver-lead	Menheniot	P. Clymo	Liskeard	ditto	ditto	—	—	845	18,872 10 3		1-12
80	Wheal Owles	70 0 0	70 0 0	22 10 0	1800	Tin	St. Just	J. Boyns	St. Just	ditto	ditto	—	255	—	17,821 14 8		1-25
396	Wheal Seton	107 0 0	160 0 0	18 0 0	7128	Copper	Camborne	T. H. Tilly	Falmouth	ditto	Two months	4035			20,533 4 0		1-15
1040	Wheal Trelawny	5 10 0	21 0 0	2 2 6	2184	Silver-lead	Menheniot	Dunsford & Ranken	Broad-street-buildings	ditto	Three months	—	—	1072½	25,123 1 9	1863 .. 21	1-15 18
2044	Wheal Tremayne	6 11 3	—	0 15 0	1533	Tin	Gwinear	T. W. Field	Marazion	ditto	ditto	—	179	—	12,857 19 9††		1-40

* This amount includes 139 tons 13 cwts. arsenic, sold for 139*l.* 12s. 4d.
† This amount includes tinstuff, sold for 2008*l.* 7s. 9d.
‡ This amount includes 62 tons of arsenic, sold for 118*l.*
§ This amount includes arsenic, 50*l.*
‖ This amount includes tin, 671*l.*, and arsenic, 12*l.*
¶ This amount includes blende and mundic, sold for 41*l.* 3s. 10d.
** This amount includes 87 tons of silver ores, sold for 5658*l.*
†† This amount includes copper, 15*l.* 18s. 9d., arsenic, 109 tons 12 cwts., 95*l.* 17s. 6d.
‡‡ Since this dividend was paid a call of 10s. per share (2400*l.*) has been made.
§§ After Jan. 1, 1864, the dues to be 1-15th.
¶¶ These returns are only from April 1, when the present company took possession.

WELSH MINES.

5000	Bronfloyd	2 7 6		0 10 0	2500	Lead	Llanbadurn Faur	J. B. Balcombe	Moorgate-street, E.C.	Limited (3*l.*)		—	Blend	426	5,850 0 0	1853 .. 21	1-14
867	Cwm Erfin	7 10 0		2 5 0	1950¾	Lead	Cardigan	J. Taylor and Sons	6, Queen-street-place	Cost-book	Two-monthly.	—	—	717	11,146 0 0		
128	Cwmystwith	60 0 0		20 0 0	2560	Lead	Ditto	J. Taylor and Sons	6, Queen-street-place	ditto	ditto	—	—	1307	16,905 0 0		
3000	Dyfngwm	12 6 6		0 2 6	375	Lead	Penegais (Mont.)	G. Hadley	8, Old Jewry	ditto	ditto	—	—	393	4,294 15 10*		
300	East Darren	32 0 0		11 0 0	3300	Lead	Cardiganshire	J. Taylor and Sons	6, Queen-street-place	ditto	ditto	—	—	220	14,591 0 0		
400	Lisburne	18 15 0		23 0 0	7200	Lead	Cardiganshire	J. Taylor and Sons	6, Queen-street-place	ditto	ditto	—	—	2722	37,213 0 0		
1800	Minera	25 0 0		29 0 0	52200	Lead	Wrexham	J. Frazer	Wrexham	Joint-stock.	Three-monthly	—	800¼	6409	89,208 14 6†	31	

* 20s. in 22 cwts. † 1-12th on lead and 1-10th on blende.

ST. JOHN DEL REY MINING COMPANY (Limited.)—Advices received Jan. 4, ex steamer *Parana*, from Brazil:—

Morro Velho, Nov. 30.—GENERAL OPERATIONS.—Since the date of last advices here our general work has been carried on with the usual regularity, and without any interruption worth noting. We have had a favourable change in the weather, and a moderate rain-fall, by which the water-power has been most acceptably and considerably increased. This has aided the hauling operations from the mine, and also enabled the stamping-mill to do increased duty. No inconvenience has been caused by the sudden increase in the water-supply, the water-courses having carried well their augmented contents, without in any way suffering therefrom.

REDUCTION DEPARTMENT.—The supply of stone received from the mines during the past fortnight has been larger than previously, owing to the increase we have had in the hauling-power. The proportion of killas it contained is about the same as heretofore. The Lyon stamping-mill was stopped for about eleven hours, to admit of raising the water-wheel, putting in new brasses under the axle, replacing some buckets and backing, putting on segments, and effecting other repairs to this wheel. A new pinion, consisting of brass segments cast here, was put on the eastern stamps-axle, and also new brasses under the gudgeons of both axles, next the water-wheel for carrying more steadily the gear work. With the exception of this necessary stoppage the general stamps and machinery have been fully employed throughout the department for the period here alluded to. The spalling has been effected in the usual manner, and quite the average quantity of sand has been treated at the amalgamation house. The supply of water has been sufficient to keep the whole of the arrastres at work.

PRAIA.—The machinery and arrastres of these works from the increased supply of water have been doing more than average duty during the past two weeks. There has been a good supply of hard material received from Morro Velho, although the quality of the sand does not appear to have been so good as has sometimes been noticed here. More than an average amount of duty has been done, and the arrastres have been kept in good working order.

MINE.—There has been a steady attendance of natives, and a good general force in the mines, and quite the average amount of stone quarried. At present there is a fair stock in the mine, so that we are prepared for the "Festa Days" of the Independence of Brazil, which takes place in the beginning of December. A large force is employed in the timberwork in the mines, and the inclined planes are being improved; Schneider's line made straight down the centre of the Bahu; the useless and inconvenient curve introduced into that line has now been removed, with very great advantage to our hauling plans on the lower part of that line, which now terminates straight in the centre of the excavation. This is more convenient, as well as expeditious for filling and raising the kibbies from the sump and adjoining stopes. A fair amount of general duty has been done during the past fortnight. From having given more than usual attention to the surface water tables round the mouth of the mines, we have not suffered the usual inconvenience of having greatly increased water in the mines so far this season.

WEST QUEBRA PANELLA.—The sinking has gone on steadily here, and we have had quite the usual supply of stone from this section of the stoping operations. The quality of the ores continues good, and the lode maintains its size, with rather less quartzose matter in it at present.

GOLD EXTRACTED TO DATE.—The produce of the stamps for the second division of Nov., being a period of 11 days, is as follows:—

	Oitavas.	Tons ore.	Oits. per ton.
From General stamps	7,444	from 1280·8 =	5·811
,, Herring (East Bahu)	3,520	373·6 =	9·421
,, Lyon (W. & Mid. Cachoeira).	2,924	399·2 =	7·324
Total stamps	13,888	2053·6 =	6·762

Advices received Jan. 19, 1864, per French steamer *Estramadure, via* Bordeaux:—

Morro Velho, Dec. 17, 1863.—PRODUCE.—The produce for the month of November amounts to 41,450 oits., and has been derived as follows:—

	Oits.	Tons ore.	Oits. p. ton.
From General stamps	20,960	from 3492·0 = 6·002	6·740
,, Herrring (East Bahu)	9,080	997·6 = 9·101	
,, Lyon (Mid. and West Cachoeira).	7,465	1074·4 = 6·948	
Total stamps' produce	37,505	5564·0	
Arrastre produce	1,714		=0·309
Total	39,219		
Praia produce	2,231		7·049
Total produce	41,450		

The foregoing produce for the month of November, taking into account the supply of

ore available and the amount reduced, may be regarded as a fair return of gold from the ore treated. It may be observed that it is the result of about 182 more tons of ore than was reduced in October, but at the same time the yield per ton of ore reduced is rather better. The improvement in the standard yield reported for October continues to be given by the East Bahu ore, which is this month 1·011 oits. per ton higher. That from the general stamps and the Middle and West Cachoeira together are practically the same as in October, but the daily produce for November, having only 30 days, is better than that obtained in the previous month.

During the greater part of the month there has been a better reducing power available in the increased supply of water we have had than in October, though we have had several stoppages for the repairs of portions of the water-wheels and stamping-mills, which lessened the time the stamps might have worked for the extraction of produce.

COST AND PROFIT.—The gold extracted is 41,450 oits.

Deduct loss in melting	199 oits.	
Leaving bar gold	41,251 oits.	
Which at 7s. 9d. per oit. amounts to		£15,984 15 3
The cost for Nov. is Rs. 90,292 $380, at exchange 2s. 3⅛d. per milrei		10,346 5 7
Leaving a profit of		£5,638 9 8

On the month's working. The total amount of cost in milreis is about the average monthly outlay recently incurred. The prices of materials and provisions have been favourable, and the consumption of these articles has not exceeded the average. We have a good stock of all requisite articles on hand at present, and the season so far promises to be favourable for nearly all articles of provisions in this district. Taking into account the extra work we are carrying on, the profit for the month may be considered as satisfactory.

REDUCTION DEPARTMENT.—The duty performed in this department may be seen in a general manner from the following summary:—

Stamps, working 30 days, average	132·87 heads.
" " 135 heads, average	29·52 days.
Arrastres, each has worked an average of	25·25 days.
" average produce on that of stamps	4·57 per cent.
Produce of each stamp-head per diem	9·411 oits.
" " arrastre "	4·243 oits.
The quantity of ore reduced amounts to	5564·0 tons.
" " killas rejected "	1661·6 tons.

Sand amalgamated, 4368 cubic ft., which yielded an average gold return of 8·97 oits. per cubic foot.

The unrecovered gold contents are 20·31 per cent. Towards the end of the month, as previously advised, we had rather a long stoppage of the Lyon stamping-mill for repairs; but the advantage of improved speed and efficiency gained thereby have since been more than equivalent for the time devoted to the requisite repairs. The work on the spalling-floors has not been quite so regular as we could desire, owing to the occasional short supply of stone from the mines. The spalling has been pretty good, and the quantity of sand treated large, without any inconvenience to the amalgamating machinery. We have a good supply of water, and the stamps and arrastres and other machinery have been driven at full rates of speed.

PRAIA.—At these works the increased water supply has enabled the stamps to reduce lately a greatly increased quantity of hard quartzose material in the re-treatment of sand. For November the produce of the stamps has been 1515 oits.; and arrastres, 716 oits.; total, 2231 oits. During the month the quality of the sand received at these works has not been so good as previously, owing to the poorer material treated at the Cotesworth stamps, and the small gold contents of the residual sand from the Lyon. From these stamps only does the sand go direct to the Praia works. All the other sand received is first re-treated at the Morro Velho arrastres, from which the sand came to the Praia works unusually poor, otherwise we should have had a larger produce, as the stamps were well supplied with hard material.

MINE.—The general mine force for November, though good, has not been quite equal to that of October. The daily borers, natives, averaged 258·04; ditto others, 15·36; total borers, 273·40. The total natives gave an average of 361·88; others, 477·04; making a total average of 838·92. The average for October amounted to 873·74, or about 34 more daily. The quantity of stone quarried and brought to the surface amounts to 8537 mine wagons, which gives an average of 31·22 wagons per borer, being larger and better duty than was performed in October. In the Cachoeira Mine the sump has been sunk 4 feet 8 in. vertically, one additional pump put in the sinking lift, two stuffing boxes and glands provided, and 20 ft. of main rods supplied. At various points in the mine 21 logs of timber have been put in for supporting the excavation.

For block pillar work 29 pieces of timber have been put in, 4 reprieve pieces at No. 9 stull, and 27 runners have been put in to strengthen the large sollars; 3 pieces have been put in, and 12 runners to extend No. 16 stull, and a close row of timbering begun in the East Cachoeira. A great many reprieves have been effected, and a large amount of repairs accomplished during the month.

In the BAHU MINE the sump has been sunk 4 ft. 5 in. vertically; a new pump put in the sinking-lift, and one main rod, 35 ft. long, provided and put in; several cross-pieces renewed in their places at the inclined planes, and two new runners put in. The curve in Schneider's line has been removed, and the line run straight down in the centre of the excavation, much to the advantage of the hauling operations in the east of the Bahu Mine. There has not been much timber-work required in the Bahu during the month excepting repairs to sollars and footways. The lode in the Middle Cachoeira continues contracted, small, and hard to quarry, extending over three stopes, and inclining into the south wall. In the other parts of the mine, the east sump and western part, the lode quite maintains its usual size and quality. Throughout the Bahu the lode is large and good, as it has ever been. In both mines the lode throughout is being fairly stoped from east to west. During November an unusual amount of timberwork has been done, especially in the Cachoeira Mine, and no less than 4382 cubic feet of timber used in logs; the sinking and general work having been carried on vigorously, and without much interruption. The mine duty, on the whole, has been satisfactory.

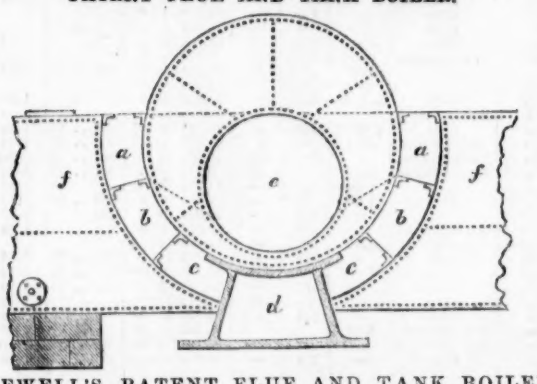
WEST QUEBRA PANELLA.—The sump has been sunk here during the month 2 feet 3 in.; the end westward has been driven 4 feet, and one additional length put in the sinking lift. There is no change in the lode.

GOLD EXTRACTED TO DATE.—The produce of the stamps for first division of Dec. being a period of 11 days, is as follows:—

	Oitavas.	Tons ore.	Oits. per ton.
From General stamps	7427	from 1273·0 =	5·834
" Herring stamps (East Bahu)	2352	379·2 =	6·202
" Lyon stamps (M. & W. Cachoeira)	2819	464·0 =	6·075
Total stamps' produce	12,598	2116·2	5·953

The above produce for the first division is nearly the same return of gold we obtained in the same period of November, but it is the produce of 112 tons more ore, which has been stamped, owing partly to the increase of water-power. On two occasions during this period we had breakages of chains, which caused rather long interruptions in the hauling, and by this means we had not ore enough for the supply of all the stamps—hence the lower gold return of the period embraced in this division. When an interruption is occasioned in the hauling-power, which is kept at its fullest stretch, to keep the stamps supplied with ore, the loss thus sustained cannot be recovered. We are going on now steadily. At present the health of the establishment is good, though the changes of season and temperature have been rather trying.

PATENT FLUE AND TANK BOILER.



JEWELL'S PATENT FLUE AND TANK BOILER
A PLAN FOR ECONOMISING THE CONSUMPION OF FUEL IN STEAM BOILERS.

The advantages of this boiler, an illustrated description of which was published in the MINING JOURNAL of October 3, are obvious.

It is provided with WROUGHT IRON FLUES, conveying the fire entirely over the surface of boiler below the water line, and wholly doing away with lime coming in contact with any part of the boiler, lime having been found to destroy the boiler plates before any other parts are the worse for wear. This boiler has four additional flues to the plan at present adopted, thus affording a FAR GREATER AMOUNT of HEATING SURFACE, and MORE EFFECTUALLY CONSUMING the GASES. Between the boilers a wrought-iron tank is fixed, extending the whole length of the boilers, for containing water for feed; this water will pass into the boiler at any temperature required. This boiler will not require anyone to enter the flues for cleansing, as the flues are provided with shifting stoppers at the ends, enabling a person to cleanse the flues even while the boiler is hot; this plan answers for any size or length boiler, and will do away with the cold water feed, which has been the cause of so many accidents. These flues are made of wrought or cast-iron. On the top of the tank a pipe will be placed, to take the waste steam that escapes and carry it to the cistern. The flues for a 6 ft. boiler will be 2 ft. long, and the usual width. It must be remembered that the tank once hot will remain a hot body, with the same amount of heat that passed off before in the brick flues. I would observe that there will be no more water taken from these tanks than will be required for the feed, consequently no more cold water will pass into these tanks than will be necessary for feeding. It is believed this plan will SAVE TEN FEET in the LENGTH of BOILER, and it has been proved to EFFECT a SAVING of rather MORE than ONE-THIRD in the CONSUMPTION of FUEL. These boilers, with flues and tanks, can be supplied on the most reasonable terms.

NOTE.—This plan of Flues and Tank Boiler will be found very beneficial for MARINE ENGINES; the tank would receive the water from the sea, and would not only become hot for feed, but would be the means of preventing in a great measure the salt from passing into the boiler. Where great quantities of hot water are required for other purposes, these tanks will also be found very beneficial. JOHN JEWELL.

Basset Foundry, Devoran, September 30, 1863.

*** Mr. JEWELL is PREPARED to GRANT the ROYALTY to any parties, for certain districts of the United Kingdom.

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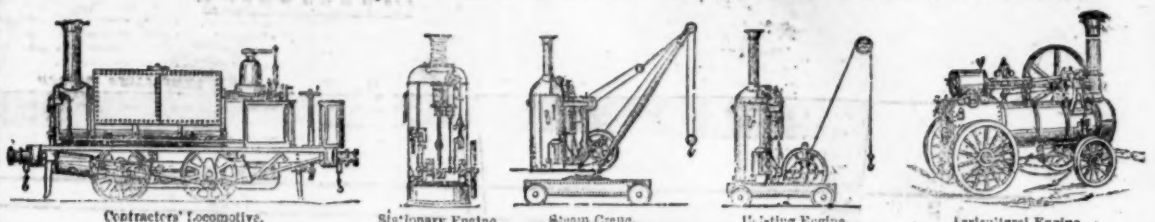
NEW PATENT PORTABLE STEAM ENGINES AND BOILERS.



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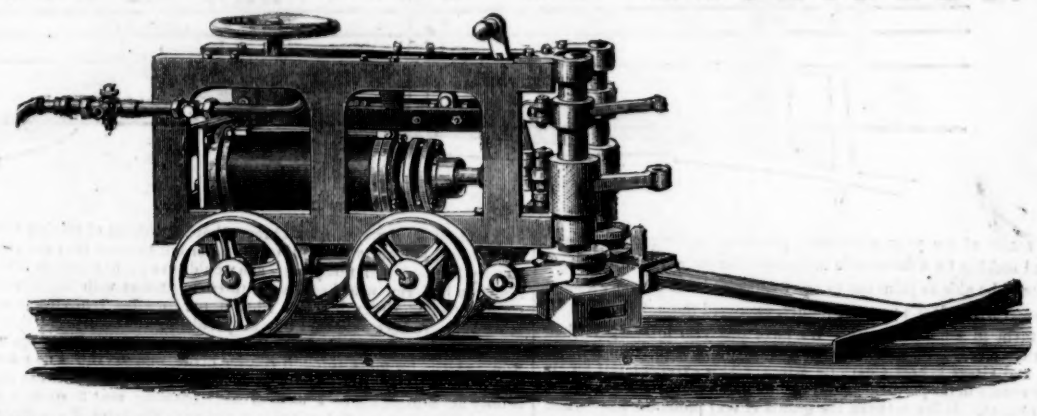
Prices complete, delivered free in Glasgow, Hull, Liverpool, or London,

6	horse power, pair of cylinders	4½	in. diameter	×	9	in. stroke	£300	15 horse power, pair of cylinders 7½ in. diameter × 14 in. stroke			£500
9	"	"	5½	"	× 11	"	350	21 " " 8½ " × 14 "			600
12	"	"	6½	"	× 13	"	450	27 " " 9½ " × 16 "			720

Prices of STATIONARY ENGINES, STEAM CRANES, HOISTING ENGINES, AGRICULTURAL, PUMPING, and OTHER ENGINES on application.
J. B. BROWN AND CO., 18, CANNON STREET, CITY, LONDON, E.C.

COAL CUTTING BY MACHINERY.



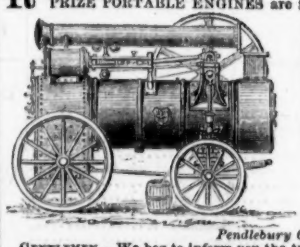
MESSRS. RIDLEY AND JONES have, by recently PATENTED IMPROVEMENTS, COMPLETED their TRUNK COAL CUTTING MACHINE, WORKED by COMPRESSED AIR, and are NOW PREPARED to NEGOCIATE for the USE, and to SUPPLY MACHINES, which will be found to COMBINE SIMPLICITY of CONSTRUCTION with PORTABILITY and ECONOMY in WORKING. By the use of these machines a CONSIDERABLE SAVING of COAL is EFFECTED, and the COST of LABOUR MUCH REDUCED. Each machine will be guaranteed as to its capabilities, &c.
All applications to be made to Messrs. RIDLEY and JONES, No. 11, South-street, Finsbury, London, E.C.
*** COLLIERY PROPRIETORS are CAUTIONED against PURCHASING or USING MACHINES, the construction of which will constitute an INFRINGEMENT of the ABOVE PATENT.

International Exhibition, 1862—Prize Medal.

JAMES RUSSELL AND SONS (the original patentees and first makers of wrought-iron tubes), of the CROWN PATENT TUBE WORKS, WEDNESBURY, STAFFORDSHIRE, have been AWARDED a PRIZE MEDAL for the "good work" displayed in their wrought-iron tubes and fittings.
Warehouse, 81, Upper Ground-street, London, S.

Prize Medal, International Exhibition, 1862.

RUSTON, PROCTOR, AND CO.'S CELEBRATED PRIZE PORTABLE ENGINES are SPECIALLY ADAPTED for WINDING, PUMPING, SAWING, &c. These engines have, in public competition, won the highest honours. For ECONOMY in WORKING, LARGE ALLOWANCE of POWER in CYLINDER AREA and PROPORTIONATE SIZE of BOILER, STRENGTH of CONSTRUCTION, HIGH FINISH, and GENERAL EFFICIENCY, they are unrivalled, having recently been AWARDED THIRTEEN GOLD, SILVER, and BRONZE PRIZE MEDALS, And numerous other prizes.



Messrs. A. Knowles and Sons write:—
Pendlebury Colliery, near Manchester, June 5, 1861.
GENTLEMEN,—We beg to inform you tha twe have now in use the portable engine of 8 horse power you supplied us with, and have great pleasure in informing you that it works well, and we are much pleased with the workmanship and finish of it.
We are, yours respectfully, ANDREW KNOWLES AND SONS.

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(Certified by Mr. William Macdonald, superintendent.)

Sizes.	Garnock, Bibby, and Co. Tons c.	Corresponding sizes from other manufacturers. Tons c.	Tons c.
3¼ in.	18 5*	16 10	11 10
2⅛ in.	8 15*	7 15	5 0

Remaining sizes with similar results.
* Samples taken promiscuously from stock by a rival manufacturer's agent.
GARNOCK, BIBBY, AND CO.,
SWAN HEMP AND WIRE ROPE MANUFACTURERS, LIVERPOOL.
FLAT and ROUND STEEL and IRON WIRE ROPES for MINES, &c., of SUPERIOR QUALITY.

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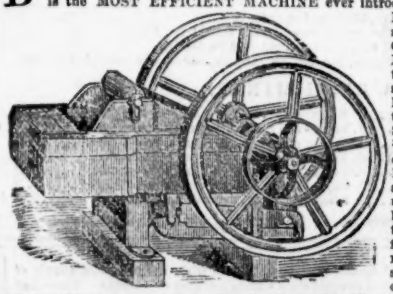
BLAKE'S PATENT STONE BREAKER is the MOST EFFICIENT MACHINE ever introduced for the CRUSHING HARD MATERIAL, such as IRON, LEAD, TIN, or COPPER ORE, QUARTZ, EMERY, FLINT, &c. It takes in pieces larger than any other machine, and with less power will REDUCE the MATERIAL to ANY SIZE, from 2½ inches to ⅜ inch. Several of the principal firms in this country have adopted it, and find a GREAT SAVING in its use. As the material broke by this machine packs better, it is specially adapted for preparing ballast for railroad purposes, and is fast superseding all other modes of breaking. For simplicity and durability it is unequalled. For circulars and testimonials, apply to—



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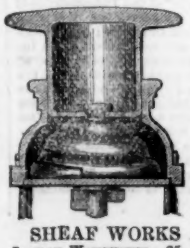

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